WHAT IS CLAIMED IS:

1. A semiconductor element comprising microcrystalline semiconductor, having a semiconductor junction in a microcrystal grain.

2. The semiconductor element according to claim 1, wherein the microcrystalline semiconductor comprises silicon atoms.

3. The semiconductor element according to claim 1, wherein the microcrystalline semiconductor comprises germanium atoms.

4. The semiconductor element according to claim 1, wherein the microcrystalline semiconductor comprises hydrogen atoms.

5. The semiconductor element according to claim 1, wherein the microcrystalline semiconductor comprises halogen atoms.

6. The semiconductor element according to claim 1, wherein the microcrystal grain is columnar.

7. A semiconductor element comprising a semiconductor layer having first electric characteristics, a semiconductor layer having second

electric characteristics, and a semiconductor layer having third electric characteristics stacked in the named order, wherein a microcrystal grain is present extending over at least a portion of the semiconductor layer having the first electric characteristics and at least a portion of the semiconductor layer having the second electric characteristics.

8. The semiconductor element according to claim 7, wherein a microcrystal grain is present extending over at least a portion of the semiconductor layer having the second electric characteristics and at least a portion of the semiconductor layer having the third electric characteristics.

9. The semiconductor element according to claim 7, wherein one of the semiconductor layer having the first electric characteristics and the semiconductor layer having the third electric characteristics is a p-type semiconductor layer and the other thereof is an n-type semiconductor layer, and wherein the semiconductor layer having the second electric characteristics is an i-type semiconductor layer.

10. A semiconductor element comprising microcrystalline semiconductor, having a region where microcrystal grains with different grain diameters are

present as a mixture.

11. The semiconductor element according to claim 10, wherein the microcrystalline semiconductor comprises silicon atoms.

12. The semiconductor element according to claim 10, wherein the microcrystalline semiconductor comprises germanium atoms.

13. The semiconductor element according to claim 10, wherein the microcrystalline semiconductor comprises hydrogen atoms.

14. The semiconductor element according to claim 10, wherein the microcrystalline semiconductor comprises halogen atoms.

15. The semiconductor element according to claim 10, wherein the microcrystal grains are columnar.

16. The semiconductor element according to claim 10, having a semiconductor junction in the microcrystal grains.

17. A semiconductor element comprising a semiconductor layer having first electric

characteristics, a semiconductor layer having second electric characteristics and a semiconductor layer having third electric characteristics stacked in the named order, wherein microcrystal grains with different grain diameters are present as a mixture in at least one of the semiconductor layers.

18. The semiconductor element according to claim 17, wherein a microcrystal grain is present extending over at least a portion of the semiconductor layer having the first electric characteristics and at least a portion of the semiconductor layer having the second electric characteristics.

19. The semiconductor element according to claim 17, wherein one of the semiconductor layer having the first electric characteristics and the semiconductor layer having the third electric characteristics is a p-type semiconductor layer and the other thereof is an n-type semiconductor layer, and wherein the semiconductor layer having the second electric characteristics is an i-type semiconductor layer.

20. A method of manufacturing a semiconductor element, comprising the steps of:

forming a semiconductor layer having first electric characteristics on a substrate;

crystallizing the semiconductor layer having the first electric characteristics; and

growing a crystalline semiconductor layer having second electric characteristics on the crystallized semiconductor layer having the first electric characteristics, thereby growing a microcrystal grain so as to extend over the semiconductor layer having the first electric characteristics and the semiconductor layer having the second electric characteristics.

21. A method of manufacturing a semiconductor element, comprising the steps of:

forming a crystalline semiconductor layer having first electric characteristics on a substrate; and

growing a crystalline semiconductor layer having second electric characteristics on the semiconductor layer having the first electric characteristics, thereby growing a microcrystal grain so as to extend over the semiconductor layer having the first electric characteristics and the semiconductor layer having the second electric characteristics.

22. A method of manufacturing a semiconductor element, comprising the steps of:

forming a semiconductor layer having first electric characteristics on a substrate;

growing a semiconductor layer having second

electric characteristics on the semiconductor layer having the first electric characteristics; and

effecting annealing to form a microcrystal grain so as to extend over the semiconductor layer having the first electric characteristics and the semiconductor layer having the second electric characteristics.

23. A method of manufacturing a semiconductor element, comprising the steps of:

forming a crystalline semiconductor layer on a substrate; and

ion-implanting a dopant into the semiconductor layer to form a semiconductor junction in a microcrystal grain of the semiconductor layer.

24. A method of manufacturing a semiconductor element, comprising the step of generating a plasma in a gas phase to decompose a source gas thus forming a semiconductor layer comprising microcrystals on a substrate, wherein an electric power to be applied to the plasma is periodically changed to form a semiconductor layer comprising microcrystal grains of different sizes as a mixture.

25. A method of manufacturing a semiconductor element, comprising the step of generating a plasma in a gas phase to decompose a source gas thus forming a

semiconductor layer comprising microcrystals on a substrate, wherein a halogen-containing gas is added at regular intervals into the source gas to form a semiconductor layer comprising microcrystal grains of different sizes as a mixture.